

## Two new butterfly subspecies from South Dzhungaria

(Lepidoptera, Rhopalocera)

by

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received 16.II.2014

**Abstract:** Two new subspecies are described: *Colias cocandica tanyusha* subspec. nov. and *Oeneis hora stashkivi* subspec. nov. Both were found at Uitas Mountain, South Dzhungaria, Kazakhstan. Some new data about the Lepidopteroфаuna of this poorly explored area are also presented in the paper.

**Резюме:** Описаны два новых подвида: *Colias cocandica tanyusha* subspec. nov. и *Oeneis hora stashkivi* subspec. nov. Оба найдены на склонах горы Уйтас, Южная Джунгария, Казахстан. Приведены и другие новые данные по фауне дневных бабочек этой слабоизученной территории.

**Introduction:** The mountain area of the so called South Dzhungaria (SE Kazakhstan) includes several mountains massifs/small ranges (Burkhansarytau, Toksanbai, etc.). Zoogeographically, South Dzhungaria represents a separate small region connected with Boro-Khoro and Dzhungarsky Alatau and inhabited by a number of endemics at the level of subspecies and even species. This territory is poorly explored since good roads are completely absent, thus, only toilsome tracking may lead to success; even the foothills and nearest mountain ridges are not fully investigated. For example, WAGNER had described the new taxon of *Melitaea* from Uitas Mount already one hundred years ago (i. e. *Melitaea asteroida* var. *uitasica* WAGNER, 1913), which status has not yet been clarified since the material is lacking. Uitas Mount (N 44°42'20,13", E 79°52'50,89", 3961 m. a. s. l. is surrounded by the horseshoe of Toksanbai range with the dominant tops of 3800-4100 m. a. s. l. This structure is instrumental in changing the microclimate of Uitas slopes which are not as rainy/snowy but rather warmer and drier comparing to normal alpine belt of South Dzhungaria. As a result, many species groups which are common for Tian-Shan/Boro-Khoro but practically unknown for other parts of South Dzhungaria can be found here together.

Newly received material was obtained from two expeditions organized in 2012 and 2013 by the second author of this paper. The expedition team was as follows: K. DOVGAILO (Minsk), T. DOVGAILO (Minsk), I. SOLODOVNIKOV (Minsk, 2012), P. GOLUB (Minsk, 2013).

The large series of *Melitaea asteroida uitasica* WAGNER, 1913 was collected. The study of the series confirms the subspecies status for this taxon (even the species status cannot be ruled out, however, further detailed study is needed). A short series of newly described *Pieris kashima* ZHDANKO, 2007 was collected also, including the ♀ which was not known before. In our opinion, this taxon as well as *Pieris eitschbergeri* LUKHTANOV, 1996 represents an isolated subspecies of *Pieris deota* (DE NICEVILLE, [1884]), but we still keep this opinion open. The photo of the ♀ was sent to A. ZHDANKO for publishing.

Both new taxa were also found at Uitas Mt. and the surrounding ridges.

The holotypes will be deposited in the DSMM (Darwin State Museum, Moscow). The paratypes are in the authors collections, several paratypes of new *Colias* are in the collection of J. GRIESHUBER (Egglham, Germany).

Abbreviations: FW - forewing; HW - hindwing.

### *Colias cocandica tanyusha* subspec. nov.

Holotype ♂: S. Dzhungaria, Toksanbai Range, Uitas Mt. (south. sl.), upper stream of B. Kybyl Riv., 3.07.2012, 3000-3250 m, K. DOVGAILO leg. DSMM

Paratypes: 1 ♂, 4 ♀♀, same loc., 2.-3.07.2012, K. DOVGAILO leg.; 1 ♂, same data, I. SOLODOVNIKOV leg.; 3 ♂♂, 1 ♀, same loc., 25.-26.06.2012, 3000-3250 m, K. DOVGAILO leg.; 1 ♂, same data, I. SOLODOVNIKOV leg.; 17 ♂♂, 10 ♀♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (SE slopes), 9.-13.07.2013, 3100-3200 m, K. DOVGAILO & T. DOVGAILO leg.; 11 ♂♂, 1 ♀, same loc., 16.07.2013, 3200-3400 m, K. DOVGAILO leg.; 14 ♂♂, 7 ♀♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (west ridges), 16.07.2013, 3200-3400 m, T. DOVGAILO leg.; 29 ♂♂, 9 ♀♀, same loc., 20.07.2013, 3200-3400 m, K. DOVGAILO & T. DOVGAILO leg.; 2 ♂♂, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (SE slopes), 13.07.2013, 3100-3200 m, P. GOLUB leg.; 15 ♂♂, 5 ♀♀, same loc., 3200-3400 m, 16.07.2013, P. GOLUB leg.; 2 ♂♂, 2 ♀♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (west ridges), 20.07.2013, 3200-3400 m, P. GOLUB leg.; 1 ♀, S. Dzhungaria, Toksanbai Mts., upp. stream Mynzhelki r., 3300 m, 22.08.1999, leg. A. ZHDANKO.

Notes: The situation with the subspecific structure of *Colias cocandica* ERSCHOFF, 1874 was addressed by GRIESHUBER et al. (2012). We agree that the nominate subspecies occupies the territory from Turkestansky range to North Alai, where some intermediate forms between it and *C. c. pljushtchi* VERHULST, 2000 are registered; the latter taxon occurs at the main part of Tian-Shan.

GRIESHUBER et al. (2012) also marked that the identification of some populations from Transalai is difficult, he noted this situation for the eastern part of this range, for example. This problem has a logical solution: the main part of the fauna of SE Alai and NE Transalai, i. e. fauna of the upper stream of Chinese Kysyl-Su river, belongs to the Tian-Shanian one and not to Alai-Pamirian (except for the species inhabiting the highest biotopes). It is also true in the *cocandica*-case and explains serious differences between *C. cocandica* ERSCH. from West and East Transalai. Moreover, the status of *C. cocandica* ERSCH. from West Transalai seems more questionable, and cannot be settled without the butterflies from Peter the Great Range and West Pamirs. The material from the latter areas is very rare or absent in the collections.

*Colias cocandica maja* GRUM-GRSHIMAILO, 1891 was described from the northern slopes of Boro-Khoro, China. TUZOV (1997) mistakenly treated this taxon as belonging to North Tian-Shanian fauna, but it was corrected by GRIESHUBER & CHURKIN (2003) after the investigation of the type series (with lectotype designation). *Colias c. maja* GR.-GR. represents the largest and lightest subspecies which is very different from all others. Except for the type series and some very old specimens, this butterfly was collected only few times during the last decades - for example, by S. MURZIN (Moscow) at North Boro-Khoro and by S. SALUK (Minsk) at the Chinese Tian-Shan. In both cases the material was collected for the first author of the paper, and only 4-5 specimens of all are in moderately good condition. The most valuable individuals of the taxon are now kept in GRIESHUBER's collection.

GRIESHUBER et al. (2012) published the cautious opinion that the subspecific structure of *C. cocandica* ERSCH. is of a clinal character and, thus, the subspecies status for some taxa seems questionable. In our opinion, it is a little bit illogical, since such a position reflects only the modern trend to reduce the number of subspecies. Such clinal subspecific structure is typical for very many known animal species, butterflies included, and it presents the most common subspecific structure. Moreover, in cases when subspecific structure looks like a complex of strong taxa with clear-cut distribution borders were often based on the absence of serious material and investigation of actual geographical variability; we know many cases when abundant material from numerous localities "erases" former structure of so called "strong" subspecies and shows the intergradation zones. In some other cases DNA-studies provide evidence that we are dealing with the complexes of species which were erroneously treated as subspecies in the past. Of course, it does not mean that we do not have any wrongly described subspecies, but clines cannot serve the final argument in the reduction of subspecific structure, ignoring the glacial history and populations living in the refuges.

In addition, the clines must be described based on sufficient material, and contain ALL principle valuable characters (biological and taxonomical). We need to rule out the situations when the clines of different characters go into different direction (route) forming very complicated structure. If all these requirements are met, the number of subspecies can be reduced to one or two (at the ends of the long and strong cline, according to the taxonomic practice). Without any doubts, the clines that exist into the distribution area of *C. cocandica* ERSCH. were never studied nor described enough to be sure that a majority of the subspecies must be deleted.

TOROPOV & ZHDANKO (2006) concentrated their attention on the fauna of East Kazakhstan. They noted that the presence of *C. cocandica* ERSCH. in South Dzhungaria needs confirmation. GRIESHUBER remarked in his book that the status of the populations from Dzhungarsky Alatau is unknown. Actually, the latter sentence presents a little mistake, because this species is unknown at all from Dzhungarsky Alatau, while the author wrote about one specimen from South Dzhungaria (collected by A. ZHDANKO, now it is a paratype of the new subspecies kept in the collection of J. GRIESHUBER). Except for this ♂, we have information about two more *cocandica*-specimens from South Dzhungaria kept in private collections. The representative newly collected series will be quite enough to make a decision concerning the subspecies status of this macro-population.

The comparison is done with two neighbouring subspecies: *C. c. pljushtchi* VERHULST, 2000 and *C. c. maja* GR.-GR., it is unnecessary to point out the differences from two other small-size and very dark subspecies distributed in Russian Central Asia (*C. cocandica* ERSCH. and *C. c. hinducica* TYTLER, 1926) since their distribution areas are situated far away from Dzhungaria (while the characters are clear).

#### **Description and diagnosis** (colour plate: 1-8, holotype and paratypes)

♂ FW length 22 mm in the holotype [S. Dzhungaria, Toksanbai Mts., Uitas Mt. (south.sl.), upp. stream of B. Kybyl riv., 3.07.2012, 3000-3250 m, K. DOVGAILO leg., DSM], 20-23 mm in the paratypes. The size is in general the same as in all *cocandica*-subspecies but obviously smaller than in *C. c. maja* GR.-GR.

Antennae, body, wings shape and general pattern typical for the species. The upperside ground colour is clearly yellowish with greenish shadows and reduced grey suffusion, in opposite to green or dark green of that of *C. c. pljushtchi* VERHULST, being more yellowish than in *C. c. maja* GR.-GR. The difference is clearly obvious in the ground colour, and the suffusion only masks it.

This unusual colouration resulted by the tendency of the reduction of the black pattern, especially of discal spot which sometimes looks like a small thin blackish dash. The spots inside the marginal black band are somewhat bigger than in *C. c. pljushtchi* VERHULST, especially the smallest one between R and Cu1 veins.

HW also with more developed spots inside the marginal band which form more or less a united yellowish band (while in other *cocandica*-subspecies these spots are more or less isolated from each other, as a rule).

Underside typical for the species but obviously more contrasting because of lightened submarginal area and sometimes even similar to that of *Colias nastes magadanica* CHURKIN et al., 2001.

♀ FW length 20,5-23,5 mm. The main characters are the same as in ♂: yellowish and bright upperside with moderately reduced pattern. Sexual dimorphism is not so expressed, white ♀♀ are small in number, less than 20%, while in other taxa (including *C. c. maja* GR.-GR.) such form is most common. Common form is similar to ♂ but without darkening along the veins, the spots inside the marginal band are enlarged and often practically united at the HW upperside.

Variation is not higher than in other taxa. Some specimens (7-9%) are darker and more greenish, being more similar to the representatives of *C. c. pljushtchi* VERHULST from Zailiysky Alatau. On the other hand, some specimens are bigger (having the size of small specimens of *C. c. maja* GR.-GR.) with more developed black pattern (see colour plate). Very rarely the black discal spot at the HW is nearly absent and the ground colour is clearly yellow, while the opposing variant with fully darkened upperside was not collected.

**Distribution:** Except for the type series, only few specimens are known from Burchansarytau Mts. where this taxon, as well as *M. asteroida uitasica* WAGNER, is very rare. It suggests that both taxa need special microclimate and are fully isolated from Boro-Khoro populations.

Not known from the other small zoogeographical district - Dzhungarsky Alatau (northern slopes mainly), which is connected with Boro-Khoro; the Lepidoptero fauna of this district is more similar to that of North Boro-Khoro, than to that of South Dzhungaria.

Geographically, *cocandica*-populations inhabit the tops of the ranges and, thus, the easy connections between *C. c. pljushtchi* VERHULST and the new subspecies are impossible. However, genetic exchange seems possible through the highlands of Ad-Unkur Pass and southern macroslopes of Boro-Khoro, where we can expect to find mixed *maja-pljushtchi* populations.

**Biology:** One generation. Flattened parts of the mountains slopes in alpine and subnival zones with xerophytic and poor vegetation and medium or small broken stones. Southern or southeastern expositions. The altitudes from 2850 to 3400 m. a. s. l., the butterflies were abundant from 3000 to 3200 m. a. s. l. Flies together with *Melitaea asteroida uitasica* WAGNER, *Erebia ocnus tianschanica* HEYNE, 1894, *Parnassius delphiuss delphiuss* (EVERSMANN, 1843).

**Etymology:** The subspecies is named after TATYANA DOVGAILO, a member of the Dzhungarian expedition and the wife of the second author.

#### *Oeneis hora stashkivi* subsp. nov.

Holotype ♂, S. Dzhungaria, Toksanbai Mts., Kashima, Bagyshky Pass, 23.06.2012, 2800-2900 m, K. DOVGAILO leg., DSSM.

Paratypes: 10 ♂♂, 1 ♀, same data; 2 ♂♂, same loc., 7.07.2013, K. DOVGAILO leg.; 1 ♂, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (south. sl.), upp. stream of B. Kybyl riv. (right tributary), 1.07.2012, 3000 m, K. DOVGAILO leg.; 1 ♂, 1 ♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (south. sl.), upp. stream of B. Kybyl riv., 1.-2.07.2012, 3050-3200 m, K. DOVGAILO leg.; 2 ♂♂, 1 ♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt., 1.-3.07.2012, 3100-3200 m, K. DOVGAILO leg.

Note: *Oeneis hora* GRUM-GRSHIMAILO, 1888 was described from Alai valley, northern foothills of Transalai, "Souk" river. TSIKLOVETS (2005) placed this locality somewhere close to Aram-Kungei, but without any explanation. We did not find such a river name in GRUM-GRSHIMAILO's books and papers or on any available maps (GRUM-GRSHIMAILO, 1885, 1890). Moreover, we did not find a single specimen collected at Alai or Transalai ranges, Alai valley or Fergana valley - all collecting points from many publications are based on old data. It is quite possible that the distribution area of *O. hora* GR.-GR. includes these ranges, but nobody has collected it recently - and it presents the first problem. Another problem is related to the simple fact that many taxa which are now treated as synonyms were described from Chinese Tian-Shan, mainly Juldus and Korla, on the opposite side of the known distribution area. AUSTAUT described *O. elsa* AUSTAUT, 1895 from "Thibet", later changed to "Tianchan oriental" as well as some more variations and aberrations from "Juldus" (LUKHTANOV & EITSCHBERGER, 2001). STAUDINGER described *O. verdanda* STAUDINGER, 1897 from "Korla" and "Boro-Choro in Tibet" (we assume, that the lectotype must be selected further from Korla, which was specified as the main locality in the original description). STAUDINGER marked that he had the material from Alai Range and described his taxon comparing it with Alaian material (the locality labels could be wrong, as it had happened with *Parnassius delphiuss albulus* HONRATH, 1889 for example, which was also collected by HABERHAUER somewhere in "Alai" as well as *hora*-specimens listed by STAUDINGER). However, the described characters do not provide serious differences between "*verdanda*" and *hora*-specimens from Russian Tian-Shan that is the base of the synonymy accepted now. The available figures of *O. verdanda* STGR. (SEITZ, 1910: 40) confirm this point of view; however, its actual status without the study of true nominotypical material seems questionable.

In addition, the types of some described taxa are missing while the lectotype designations were not done. Is it very difficult to work with such species. However, *Oeneis hora stashkivi* subsp. nov. is described from the limited area

situated far from all known localities and known as a separate small zoogeographical district where this species was never recorded before (TOROPOV & ZHDANKO, 2006).

We studied numerous material from Tian-Shan. The list of localities includes North Tian-Shan (Zailiysky Alatau, Kungei Alatau, Kirgizsky Alatau), Inner Tian-Shan (Kokshaal Mts., Terskey Alatau, Moldo-Too range, Dolon Pass, Dzhetim-Bel range, Kaingdy-Katta range, etc.) and Chinese Tian-Shan (Halke-Shan, Narat range and Ad-Unkur Pass). We have no material from Juldus or Korla. All studied series (except for material from Ad-Unkur Pass) are very similar and definitely belong to one taxon with the same variability pattern - we will treat this taxon as the nominate one. Thus, the status of the macropopulation inhabited the mountains of South Dzhungaria can be discussed without the finalization of the status of *hora*-populations from Juldus and Korla, because these areas are widely separated from South-Dzhungarian mountains by the distribution area of nominate subspecies.

Unfortunately, the status of the population from Ad-Unkur Pass (see below) cannot be decided without the study of the Chinese taxa.

**Description and diagnosis:** ♂ FW length 24 mm in the holotype, 23,5-26,5 mm in the paratypes, i. e. the size is the same as in nominate taxon.

Antennae, body, fringes and general pattern are typical for the species. FW shape with moderately straight margin, i. e. the margin is more or less cut off while that of nominate ♂♂ is convex. This character is not so strong and slightly variable but clearly obvious at the series.

FW upperside always without eye (only one ♂ has a slightly expressed blackish dot). This character is known for the nominate subspecies (and even was described as an aberration by AUSTAUT), presenting a very rare form only (1-3% in all studied populations, 200 specimens altogether). FW is darkened with fulvous band which consists of several spots without clear borders; the discal area is always darkened, while the basal area is often fulvous from the anal side. It forms a special marbled pattern. Nominate ♂♂ look uniform, FW varies from fully darkened colouration to brown or yellowish, but lightening of the submarginal band always extends to the main and anal surface of the wing, so, that the ground colour is variable but uniform and never marmoreal.

HW have the same marmoreal colouration; a small whitish submarginal dot sometimes is not clearly distinctive between Cu1 and Cu2 veins.

The underside is typical for the species but obviously more marmoreal: HW discal band are whitened inside while HW postdiscal area is with numerous asymmetric spots and lines. HW discal band is uniform in the nominate subspecies (or only with slightly whitened veins), and the pattern of the HW postdiscal area is less expressed but the latter character varies, and the differences from the new taxon are not so big. FW without apical eye (two specimens have a slightly expressed dark dot). HW underside without eye between Cu1 and Cu2 veins.

Genitalia do not have any serious differences from that of Inner Tian-Shanian butterflies.

♀ FW length 27,5-28,5 mm. The main characters are the same as in ♂♂, sexual dimorphism is less developed because the FW eyes are absent at all, or, in one case, one small dark dot is obvious. The nominate ♀♀ are usually with two developed eyes, or, rarely, with one eye; the specimens without the eyes are known as rare aberration.

One ♀ is yellowish, the others are darkened, marmoreal colouration is not so expressed as in the ♂♂.

**Distribution:** Known only from the type locality. The nearest *hora*-population is known from Ad-Unkur Pass, situated between Boro-Khoro and Juldus. We have only 4 ♂♂ collected in this place by S. MURZIN, they look quite different from the new taxon and the nominate one. These ♂♂ are pale, darkened, with small but obvious eyes, while their HW postdiscal underside area has no traces of marmoreal spots - so, that the butterflies recall even *Oeneis ammon* ELWES, 1899. It is very probable that they belong to one of the taxa described by AUSTAUT from Juldus.

*Oeneis hora* GR.-GR. is represented by one nominate subspecies at the main part of Tian-Shan, giant territory within several zoogeographical districts. At the same time several different taxa are formed within the species at the eastern part of the distribution area - such a pattern recalls the distribution of the *Erebia sibo*-group (CHURKIN, 2002). It means that the main part (western and central) of the present distribution area of the species was occupied by *hora*-populations recently, and this taxon basically originated from the Eastern Tian-Shan/Boro-Khoro.

**Biology:** One generation only. Flattened grassy-cereals meadows with stones and stony ridges on altitudes between 2800-3200 m. a. s. l. The ♀♀ were collected at the rocks along a scree. Local and not numerous. Flies together with *Boloria generator* STAUDINGER, 1886, *Parnassius delphi* (Eversmann, 1843), *P. actius actius* (Eversmann, 1843). The flight period lasts from the middle of June to the first decade of July.

**Etymology:** The subspecies is named after YURI STASHKIV (Minsk), an amateur entomologist without whose help our expedition would not have taken place.

**Acknowledgements:** We are very grateful to all members of the expeditions as well as to all friends who helped to prepare it, namely SERGEY KUZNETZOV (Kaskelen), TATYANA V. DOVGAILO (Minsk), Dr. IGOR A. SOLODOVNIKOV (Minsk), PAVEL V. GOLUB (Minsk), and YURY M. STASHKIV (Minsk).

We are much indebted to JOSEF GRIESHUBER (Bad Griesbach, Germany) and VLADIMIR PLETNEV (Russia, Reutov) who helped us during the work.



Special thanks to EKATERINA FOMINYKH (Moscow) for the help in preparation of the English version of this paper.

#### References

- CHURKIN, S. V. (2002): Review of the *Erebia ocnus-sibo* complex with the descriptions of new taxa (Lepidoptera, Satyridae). - *Helios* **3**: 3-49, Moscow.
- GRIESHUBER, J. & S. CHURKIN (2003): The lectotypes of *Colias diva* GRUM-GRSHIMAILO, 1891, *Colias wanda* GRUM-GRSHIMAILO, 1907, *Colias grumi* ALPHÉRAKY, 1897, *Colias cocandica maja* GRUM-GRSHIMAILO, 1891, *Colias cocandica tatarica* BANG-HAAS, 1915, and *Colias tamerlana mongola* ALPHÉRAKY, 1897 (Lepidoptera: Pieridae). - *Helios* **4**: 244-271, pl. XVI, 3-4, Moscow.
- GRIESHUBER, J., WORTHY, B. & G. LAMAS (2012): The Genus *Colias* FABRICIUS, 1807. JAN HAUGUM's annotated catalogue of the Old World *Colias* (Lepidoptera, Pieridae). - Czech Rep.
- GRUM-GRSHIMAILO, GR. E. (1885): Bericht über meine Reise in das Alai-Gebiet. - In: ROMANOFF, N. M. Mémoires sur les Lépidoptères **2**: 212-247, St.-Petersbourg.
- GRUM-GRSHIMAILO, G. E. (1888): Novae species et Varietates Rhopalocerorum e Pamir. - *Horae Soc. Ent. Ros.* **22**: 303-307, St.-Petersbourg.
- GROUM-GRSHIMAILO, GR. (1890): Le Pamirs et sa faune lépidoptérologique. - In: ROMANOFF, N. M. Mémoires sur les Lépidoptères **4**: I-XVII, 1-575, 21 Pl. A, 1-21, carte, St.-Petersbourg.
- LUKHTANOV, V. & U. EITSCHBERGER (2001): Catalogue of the genera *Oeneis* and *Davidina*. In BAUER, E. & T. FRANKENBACH, Butterflies of the world, suppl. **4**: 1-37, map 1-32, fig. 1-64. - Goecke & Evers Keltern.
- SEITZ, A. (1910): Die Groß-Schmetterlinge des Paläarktischen Faunengebietes. I. Die Paläarktischen Tagfalter. - Lehmann, Stuttgart (1906-1910).
- STAUDINGER, O. (1897): Einige neue Tagfalterarten und Varietäten. - *Dt. Ent. Z. Iris* **10**: 344-360, Dresden.
- TOROPOV, S. A. & A. B. ZHDANKO (2006): The butterflies (Lepidoptera, Papilionoidea) of Dzhungar, Tien Shan, Alai and Eastern Pamirs **1**. Papilionidae, Pieridae, Satyridae. - Bishkek.
- TSHIKOLOVETS, V. V. (2005): Butterflies of Kyrgyzstan. - Brno-Kyiv.
- TUZOV, V. K., BOGDANOV, P. V., CHURKIN, S. V., DANTCHENKO, A. V., DEVIATKIN, A. L., MURZIN, V. S., SAMODUROV, G. D. & A. B. ZHDANKO (2000): Guide to the butterflies of Russia and adjacent territories **1**. - Pensoft, Sofia-Moscow.
- WAGNER, F. (1913): Beitrag zur Lepidopterefauna des Iligebietes sowie des Sary-Dschas (Asia centr.). - *Ent. Mitt.* **2**: 22-30, 50-62, 88-95, 112-126, 153-158, 185-190, 244-254, 285-288, fig. 1-15, Berlin.

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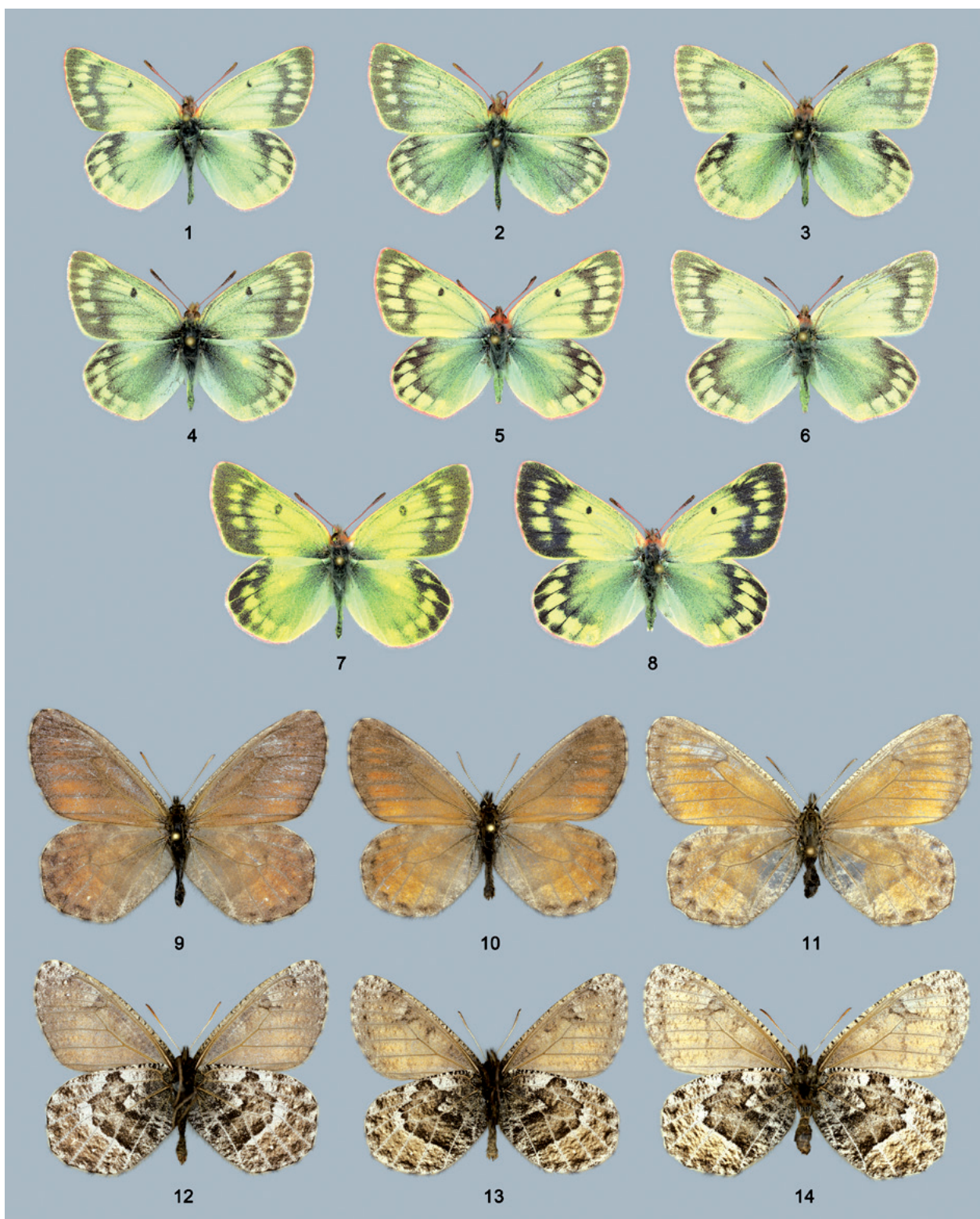


Fig. 1: *Colias cocandica tanyusha subspec.nov.*, holotype ♂, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (south.sl.), upp. stream of B. Kybyl riv., 3.07.2012, 3000-3250 m, K. DOVGAILO leg. DSMM.  
 Fig. 2, 3, 4, 7 (form): *Colias cocandica tanyusha subspec.nov.*, paratypes ♂♂, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (west ridges), 16.07.2013, 3200-3400 m, T. DOVGAILO & K. DOVGAILO leg.  
 Fig. 5, 6, 8 (form): *Colias cocandica tanyusha subspec.nov.*, paratypes ♀♀, S. Dzhungaria, Toksanbai Mts., Uitas Mt. (west ridges), 16.07.2013, 3200-3400 m, T. DOVGAILO & K. DOVGAILO leg.  
 Fig. 9, 12: *Oeneis hora stashkivi subspec.nov.*, holotype ♂, S. Dzhungaria, Toksanbai Mts., Kashima, Bagyshky Pass, 23.06.2012, 2800-2900 m, K. DOVGAILO leg.  
 Fig. 10, 13 (♂), 11, 14 (♀): *Oeneis hora stashkivi subspec.nov.*, paratypes, S. Dzhungaria, Toksanbai Mts., Kashima, Bagyshky Pass, 23.06.2012, 2800-2900 m, K. DOVGAILO leg.